



Better Buildings Alliance

Update for Higher Education

November 20, 2014
3:00 PM - 4:00 PM EST
1-866-901-6455; 722-663-945

The Better Buildings Alliance Higher Education team welcomes you!

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Agenda

- **Greetings & Better Buildings Alliance Updates**
- **Tech Demo Opportunities and Tech Solutions Teams Updates**
 - **Technology Demonstration Opportunities**
 - **Technology Solutions Teams Updates**
 - **Lighting and Electrical**
 - **Space Conditioning**
 - **Laboratories**
 - **Plug and Process Loads**
 - **EMIS**
 - **Renewables Integration**
 - **Food Service**
- **Market Solutions Team Updates**
- **Adjourn**

The Better Buildings Alliance is a key part of the Better Buildings Initiative

- DOE first began working with market partners in 2008 to further energy efficiency through the Better Buildings Alliance.
- The program plays a crucial role in helping move our country closer to the Administration's [Better Buildings Initiative](#) target of 20% energy savings by 2020.
- The [Better Buildings Alliance](#) and the [Better Buildings Challenge](#) are the cornerstone of DOE's efforts to develop innovative, replicable solutions that transform the way market partners achieve their energy savings goals.
- Cutting the energy use of U.S. buildings by 20% from current levels would save approximately \$80 billion annually on energy bills, reduce greenhouse gas emissions, and create thousands of jobs.



The Better Buildings Alliance welcomes members in a variety of commercial building sectors

SECTOR TEAMS



**COMMERCIAL
REAL ESTATE
& HOSPITALITY**



HEALTHCARE



HIGHER EDUCATION



**RETAIL,
FOOD SERVICE
& GROCERY**

- The Better Buildings Alliance represents nearly 200 member organizations and approximately 10 billion commercial square feet across key market sectors.
- Members agree to: participate in at least one Alliance activity each year and share their successes with their peers.
- DOE commits to: connect members with technical resources, and provide a platform for peer exchange.

Together, members have accomplished much already

Better Buildings Alliance Snapshot

Membership	
Number of Member Organizations	185
Square Feet Represented	10 billion
Percent of U.S. Commercial Buildings	11%
New Members in 2014	14
Teams	
Number of Technology and Market Solutions Teams	13
Activities	
Energy Savings Activities Available to Members	50+
Results	
Increase in Member Activity in 2014	20%
Average Annual Energy Savings Reported	More than 2%

Higher Education members in the Better Buildings Alliance

- Arizona State University
- Clark Atlanta University
- Cornell University
- Duke University
- Emory University*
- Grand Valley State University
- Loyola University
- Massachusetts Institute of Technology
- Portland State University
- San Mateo Community College District
- Stanford University*
- Tulane University
- University of California, Berkeley*
- University of California, Davis
- University of California, Irvine
- University of California, Merced
- University of Colorado, Boulder*
- University of Hawaii at Manoa
- University of Maryland*
- University of Massachusetts Medical School
- University of Miami*
- University of South Carolina
- University of Utah*
- University of Wisconsin*
- Washtenaw Community College

*Steering Committee Member

Members in **bold** have taken the Better Buildings Challenge

There are currently 25 members in the Higher Education Sector, accounting for over 250 million sq. ft. of space.

Every two years, these members nominate a sector steering committee

DOE would like to acknowledge and thank the Higher Education Steering Committee:

- Susan Corry, University of Maryland (Chair)
- Kathy Ann Ramirez Aguilar, University of Colorado, Boulder
- Bert Etheredge, American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
- Chuck Frost, University of California, Berkeley
- Joan Kowal, Emory University
- Faramarz Vakili, University of Wisconsin
- Jose Varona, University of Miami
- Susan Vargas, Stanford University
- Jeff Wrigley, University of Utah

Steering Committees assure that Better Buildings Alliance activities are meeting member needs

- **Sector Focus Area: Recruiting and Retaining Skilled Staff**
 - Scheduling peer exchange where select members will share successful strategies for building strong facilities and energy teams.
- **Sector Focus Area: Green Revolving Funds**
 - Scheduling a webinar with Sustainable Endowments Institute to highlight existing success stories in higher education and healthcare, and share a new tool for tracking GRF investments.

Better Buildings members can join a team to help them meet their energy savings goals...



Refrigeration



Laboratories



Energy Management
Information Systems



Renewables Integration



Lighting & Electrical



Space Conditioning



Plug & Process Loads



Food Service



Financing



Leasing & Split Incentive



Data Access



Workforce Development

...or take advantage of resources developed by peers, such as the Better Buildings Challenge partner Implementation Models

- New Better Buildings Challenge Implementation Models

- How do I pay for it? – [University of Utah](#), [Delaware State University](#)
- How can I motivate my organization? - [Michigan State University](#)
- How can I build expertise within my organization? – [Allegheny College](#)

ALLEGHENY COLLEGE



Implementation Model: Leverage Student-Faculty Research

ORGANIZATION TYPE

Higher Education Institution: small liberal arts college

BARRIER

Lack of organizational buy-in for energy efficiency, insufficient access to capital

SOLUTION

Leverage student-faculty research to predict financial benefits of energy-saving options for campus construction and renovations

OUTCOME

A virtuous circle of successful green building upgrades and associated cost savings supports a culture of sustainability on campus

Find more Implementation Models [here](#).

We also offer a Webinar Series...

Better Buildings Webinar Series

Each month, the Department of Energy will highlight the innovative work being done by Better Buildings partners and other market leaders. Webinar topics will vary and presenters will cover relevant and timely issues for building owners and managers as well as policy makers, corporate executives and sustainability directors.

+ PACE Financing for Energy Efficiency – Success Stories: Oct. 7, 2014

— Make Your Building Sing! Building Re-tuning: Sept. 2, 2014

Re-tuning is a low-cost process to identify and correct building operational problems that lead to energy waste. To expand the practice of re-tuning, the Department of Energy (DOE) and the Pacific Northwest National Laboratory (PNNL) developed a curricula focused on retuning both large (with a building automation system, or BAS) and small (without a BAS) commercial buildings. Hear from Better Buildings Challenge Partners who have employed retuning training to improve building performance and learn about opportunities to participate in trainings in your area.

[Recording \(49 MB\)](#), [Slides](#)

+ Engaging Building Occupants to Reduce Energy Use: April 1, 2014

+ Adding Solar to Your Building Portfolio: March 4, 2014

+ Real-time Energy Management: Feb. 4, 2014



Events & Conferences

December 2nd, 2014, 3:00 – 4:00 PM EST

Making Utility Efficiency Funds Work for You

A grocery chain, a major city, and a manufacturing organization will describe how they collaborate with utilities to bring big energy savings to their portfolios and help reduce the overall peak electricity demand for their utility partners. Presenters will offer recommendations for working with utilities to create innovative energy savings for different types of portfolios.

[Register here.](#)

[Register here](#) for “Making Utility Efficiency Funds Work for You”

Visit [this page](#) to review recordings and slides from past webinars

...and in-person educational opportunities

- Join more than 800 Better Buildings partners and stakeholders to learn the latest in efficiency and how to make energy efficiency a smart business decision for your organization
- Early registration will open for Better Buildings partners starting in December 2014. Registration opens to the public in January 2015



SAVE THE DATE

BETTER BUILDINGS SUMMIT

WASHINGTON, DC ■ MAY 27–29, 2015



For more information on the Summit, please visit:
energy.gov/betterbuildings/summit


More resources are available on our web site



[Click here](#) to visit the Higher Education page

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BETTER BUILDINGS ALLIANCE

Sectors

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Sectors

Commercial Real Estate & Hospitality

Healthcare

Higher Education

Retail, Food Service & Grocery

Affiliates

Higher Education

With more than 20 million post-secondary students, and over 5 billion square feet of floor space, the higher education sector in the United States spends an estimated \$14 billion annually on energy costs. Colleges, universities, and other post-secondary institutions across the U.S. hold unique places in their communities—as civic, academic, and cultural stewards, and opinion shapers. Students, staff, alumni, elected officials, and the general public expect higher education institutions to exhibit wise leadership coupled with strong fiscal oversight—a challenge in the best economic times.

Highlighted Activities	+
Energy Management Resources	+
Financing Resources	+
Additional Resources	+
Members	+

If you're not already, we hope you will become a Better Buildings Alliance Member

- Work with DOE's exceptional network of market and technical experts to develop innovative, cost effective energy solutions
- To join, complete the sign up form:
 - eere.energy.gov/betterbuildingsalliance/join

BETTER BUILDINGS ALLIANCE SIGN-UP FORM

Building owners and operators can join the Better Buildings Alliance by completing the sign-up form.

SIGN-UP FORM

Affiliates can join [here](#).

Demonstrate national leadership in energy efficiency by committing to the Better Buildings Challenge. Contact Holly Carr at Holly.Carr@ee.doe.gov for more information.

Stay in touch!

■ Join us on LinkedIn:

- Share ideas with your peers
- Post events of interest and let your peers know what events you are going to (e.g. Better Buildings meet-up at GreenBuild)
- Register for upcoming webinars
- Review new reports and resources
- Feature your company's press releases on successes or news articles on results

Click [here](#) to join



■ Follow us on [Twitter](#):

- Better Buildings [@BetterBldgsDOE](#)
 - Congrats [@gundersenhealth](#) for being 1st health system in US to achieve [#energy](#) independence!
<http://bit.ly/1yFxJhD>

Connect with us:



■ Like us on Facebook : <https://www.facebook.com/eeregov>

■ Sign up for the Better Buildings Bulletin

- Submit your email at eere.energy.gov/betterbuildingsalliance

Or look for us at one of these upcoming events:

- Smart and Sustainable Campuses Conference, March 30-31, 2015, Baltimore, MD
- ***Better Buildings Summit, May 27-29, 2015, Washington D.C.***
- APPA Annual Conference, August 4-6, 2015, Chicago, IL
- AASHE Conference & Expo, October 25-28, 2015, Minneapolis, MN

Technology Demonstration Opportunities and Technology Solutions Team Updates

Andrew Mitchell, Better Buildings Alliance Tech Team Lead

Participate in a Real Building Demonstration

- **enVerid HVAC Load Reduction:** looking for office, education, retail spaces or airport terminals without demand controlled ventilation or an Energy Recovery Ventilator.
- **BuildingIQ Predictive Energy Optimization:** already partnering with GSA and District of Columbia, looking for office, healthcare and enclosed retail malls, 100,000 sq. ft. or greater and digital controls at least on air handling units.
- **A.O. Smith micro-Combined Heat and Power:** looking for restaurant, healthcare, hospitality, multifamily or other with hot water demand greater than 3,000 gals/day in the Northeast, Midwest and California.
- **Contact:** techdemo@ee.doe.gov

We Want Your Input on Envelope Retrofits!

What? Join us for a discussion with window, wall assembly, roofing and insulation manufacturers.

Why? To provide feedback on the barriers to applications in existing real buildings and find out more about new envelope retrofit options.

Who? Alliance members interested in moving toward better envelope retrofit options.

When? March 31, 2015

Where? Oak Ridge National Laboratory

Lighting & Electrical Team

Technical Lead: Linda Sandahl, Linda.Sandahl@pnnl.gov

■ Lighting Energy Efficiency in Parking Campaign:

- leepcampaign.org
- Projected energy savings of current LEEP Participants is estimated at over 120 million kWh and over \$10 million annually
- Well on our way to achieving our 500M sq. ft. goal by March '15.
- 12 organizations recognized for leading the way in high efficiency parking lighting at April 2014 IFMA conference
- Energy savings as high as 90% at some sites, and significant maintenance savings
- Simple payback of about 2 years not uncommon
- Join LEEP to receive free technical assistance and recognition

■ Current Activities

- Updates to BBA lighting specifications underway. *Provide your input to Linda!*

■ Upcoming Opportunities

- Interior Lighting Campaign (troffer lighting) – March 2015 launch
 - Be an early adopter and sign up before the official launch
 - To receive updates, email us at InteriorLighting@pnnl.gov

■ Plans for the Future

- Explore opportunities for further integrating lighting controls in Better Buildings lighting specifications and guidance resources



Space Conditioning

Technical Lead: **Michael Deru**, michael.deru@nrel.gov

■ 2014 Highlights

- Advanced RTU Campaign – surpassed 30,000 high-efficiency RTUs (installations and control retrofits)
 - Saving 300 GWh (3 TBtu of primary energy) and \$33 million annually (!)
 - <http://www.advancedrtu.org/>
- [New resources](#) available for evaluation, analysis, and specification of new RTUs and advanced RTU control retrofits
- Pneumatic to DDC retrofit peer exchange on [advanced controls](#)

■ Current Activities

- Advanced RTU Campaign continues through 2015.
 - Nominations for the first annual RTU Campaign awards and other recognition opportunities will be announced in January 2015
- Best practice guide for RTU installed performance estimation
- HVAC systems and resource map

Space Conditioning

Technical Lead: **Michael Deru**, michael.deru@nrel.gov

- Upcoming Opportunities
 - Peer exchange for energy savings opportunities for ventilation set backs for healthcare facilities (date TBD)
 - Optimal air-system control sequences
 - Coordinate with ASHRAE to guide development and publication of best practices for air-system control sequences through Guideline Project Committee 36
 - Ventilation Best Practice Guide for retail
 - Draft version in March 2015 that will summarize the energy and indoor air quality (IAQ) impacts and best practices for maintaining high IAQ while minimizing energy use
 - Now recruiting sites to participate in demonstrations
 - enVerid HVAC Load Reduction modules; and
 - AO Smith micro-CHPs for sites with 3,000 gal/day hot water demand.

Laboratories Team

Technical Lead: **Craig Wray**, cpwray@lbl.gov



- **2014 Highlights**
 - 3 best practices guides, each with case studies
 - Navigating Building and Fire Codes for Labs (optimized ventilation) (draft)
 - Laboratory Ventilation Management Planning (draft)
 - EH&S, Facilities, and Lab User Collaboration (in review)
 - 6 webinars on techniques to manage lab safety and reduce energy use
- **Current Activities**
 - Continuing technical support for BBA member activities
 - Collaborating with I2SL to make more resources available to members and to reach larger group of stakeholders
 - Preparing scoping study to define need for lab retro commissioning guide
- **Upcoming Opportunities**
 - Work with industry leaders to deploy best practices on a large scale
 - Seeking member-implemented ECMs and associated savings
- **Plans for the Future**
 - Develop specification for safe, low-energy labs and industry training program to support expanded retrofit workforce
 - Increase Collaboration with I2SL leadership, programming, and members

Plug and Process Load Team

Technical Lead: Rois Langner, rois.langner@nrel.gov

■ 2014 Highlights

- Completed Plug Load study in healthcare
 - Massachusetts general hospital and SUNY Upstate Medical University
 - Demonstrated savings potential with night time “idle” modes
 - <http://energy.gov/eere/researching-energy-use-hospitals>
- Publications
 - NREL: *Plug and Process Loads Capacity and Power Requirements Analysis*, full technical [report](#) and [brochure](#)
 - NREL: *Healthcare Energy End-Use Monitoring*, [full technical report](#)
 - 2014 ACEEE Summer Study: *Attacking Plug Loads: A Campaign to Deploy Automated Plug Strip Controllers*, [full technical report](#)
- NREL delivered the APS Technical Specification to DOE (Draft)

Plug and Process Load Team

Technical Lead: **Rois Langner**, rois.langner@nrel.gov

■ Current Activities

■ Promotion of Advanced Power Strips

- NREL is working with building owners, manufacturers, and potentially utilities to promote APSs and plug load control solutions.
- NREL has developed “How-to” guidance for installing APSs.

■ Project Team Calls

- The next quarterly call is scheduled for December 3, 2014. Contact Rois Langner to join the call.

■ Plans for the Future

- Conduct a market and technology assessment of existing and emerging plug load controls and metering technologies,
- Conduct a gap analysis of existing and needed plug and process load resources, and
- Develop a white paper identifying short and long-term plug and process load control strategies, a life cycle cost analysis of these strategies, and potential roles for DOE to support emerging technologies in this space.

EMIS Team

Technical Lead: **Jessica Granderson**, JGranderson@lbl.gov

■ 2014 Highlights

- Initiated a series of monthly meetings for peer learning and communication
- Conducted a [webinar](#) 'crash course' to understand critical aspects of successful EMIS use
- Developed a [synthesis of existing EMIS resources](#)
- Released [regional guide to EMIS](#) Incentives to offset first cost
- Demonstrated six EMIS systems
- Developed (draft) EMIS procurement support materials (guide spec, RFP, evaluation criteria) to facilitate owner-driven technology adoption
- Documented members' EMIS implementations with current and future planned activities for expansion



EMIS: Crash Course

Jessica Granderson, Guanjing Lin, Erin Hult
Lawrence Berkeley National Laboratory



Synthesis of EMIS Resources

Jessica Granderson, Guanjing Lin, and Erin Hult
Lawrence Berkeley National Laboratory



Regional Guide to EMIS Incentives



Jessica Granderson, Guanjing Lin, Erin Hult



Procurement Support Materials for Energy Information Systems and Related Technologies

Jessica Granderson, Guanjing Lin
30 October 2014

U.S. DEPARTMENT OF
ENERGY

EMIS Team

Technical Lead: **Jessica Granderson** JGranderson@lbl.gov

■ Current Activities

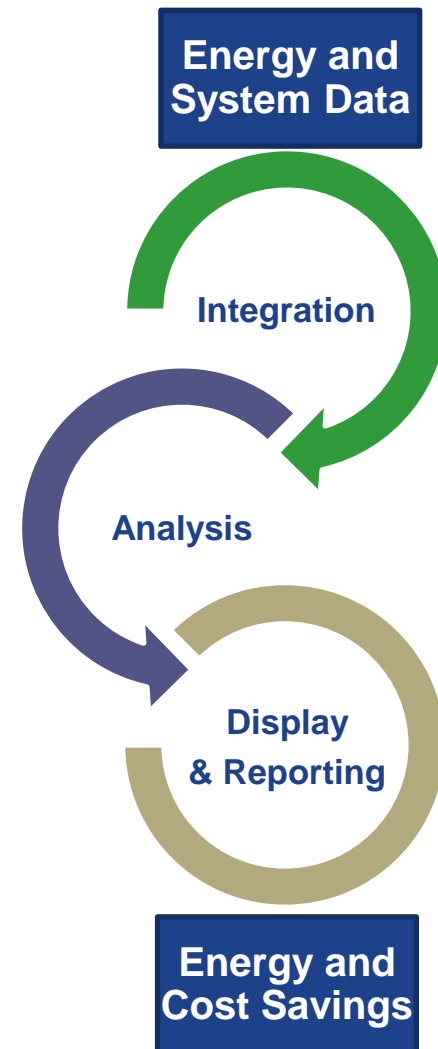
- Joint sector webinar with the Retail & Food Service Sector on Dec 9, 2-3 EST: team introduction, members' best practice EMIS uses, Q&A

■ Plans for the Future

- Increased focus on peer learning & guest presentations
 - Implementation and scale-up overviews from members, GSA Green Proving Ground, & CBI HIT demonstrations
 - EMIS to streamline and automate M&V
 - Evaluation of public sector utility pilot
 - DOE-India work in sector-specific packaged EIS solutions
- Ongoing EMIS demonstrations
- Primer on holistic organizational use of EMIS: multi-year planning, roll-out, implementation, integration vertically and horizontally

■ Upcoming Opportunities

- Now recruiting office and healthcare sites to participate in demonstration of BuildingIQ, an emerging EMIS



Renewables Integration Team

Technical Lead: Jay Paidipati, jpaidipati@navigant.com

■ 2014 Highlights

- Published commercial PV [solar decision guide](#)
- Held several team meetings, webinars and an in person meeting at Summit

■ Current Activities

- Developing sector specific solar decision guides
- Working to help develop solutions to install solar PV when building is leased

■ Upcoming Opportunities

- Team meeting on Tuesday December 2nd (3 pm EST)
- Looking for members to provide case studies

■ Plans for the Future

- We will continue to focus on helping overcome market and informational barriers to PV adoption

Food Service Technology Team

Technical Lead: **Rich Shandross**, richard.shandross@navigant.com

■ 2014 Highlights

- ACCOMPLISHMENTS: (1) ENERGY STAR food service buildings survey completed, (2) Energy Management Systems (EMS) Guidance for Food Service released, (3) Demand Control Kitchen Ventilation Guidance Series drafts finished and in review, (4) Supported focused Better Buildings Challenge outreach to food service
- NEW FOCUS AREAS: (1) Advanced controls for Walk-in Coolers and Freezers, (2) Summarizing available food service efficiency resources and identifying gaps

■ Current Activities and Ways to Get Involved

- EMS Guidance – use it and let other people know about it. [Full technical report](#)
- Quantification of EMS “secondary” benefits – reach out to Rich Shandross to discuss and share ideas and experiences

■ Upcoming Opportunities

- Walk-in Coolers/Freezer (WICF) advanced controls – volunteer to be a demo site for an advanced WICF control product **and/or** share your experiences with this technology

■ Plans for the Future

- Create multiple smaller guidance documents from EMS Guidance based on member input
- List and summary of WICF advanced control technologies
- Restaurant Resource Assessment

Project Team Updates: Market Solutions

Market Solutions Overview

- The goal of the Market Solutions Teams is to help Better Buildings Alliance members identify barriers to energy efficiency and to develop resources for overcoming non-technical barriers to deploying energy efficiency in their building stock, quickly and at scale.
- Current Focus Areas



Leasing & Split
Incentives



Finance &
Appraisal



Workforce
Training



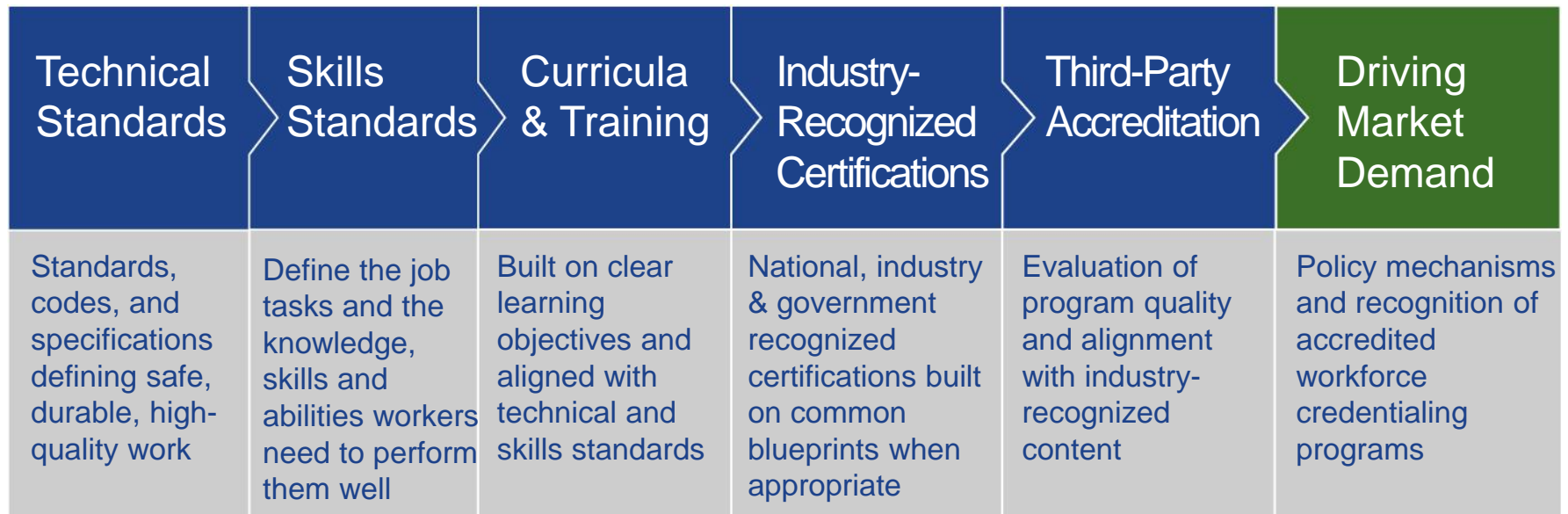
Data
Access

BBA Energy Efficiency Investment and Appraisal

- Building Asset Score Pilot
 - Spring 2015
- Strategic mapping
 - Identify intervention strategies
- Research plan
 - Demonstrate the value of investing in energy efficiency
- Appraiser Training
 - Creating course content for appraisers



Framework for a Better Buildings Workforce



Re-Tuning Resources are Available Online

Re-Tuning Resources on CBRD

Visit the Commercial Buildings Resource Database (CBRD) for free Re-Tuning Resources

(<https://buildingdata.energy.gov/cbrd/>)

- Small Commercial Building Re-Tuning Primer
- Large Building Re-Tuning Training
- Pre-Re-Tuning Trend Data
- ECAM BAS Data Analysis
- Vornado Re-Tuning 3-month Case Study
- Coming soon: Additional case study examples from re-tuning training participants

Online Re-Tuning Training Available

PNNL is offering two free interactive Re-Tuning e-learning courses to anyone interested in improving a building's energy performance and the comfort of the building's occupants

(<http://retuningtraining.labworks.org/training/lms/>)

- Re-tuning for Building with Building Automation Systems (CEUs available from the Building Operator Certification Program)
- Re-tuning for Buildings without Building Automation Systems

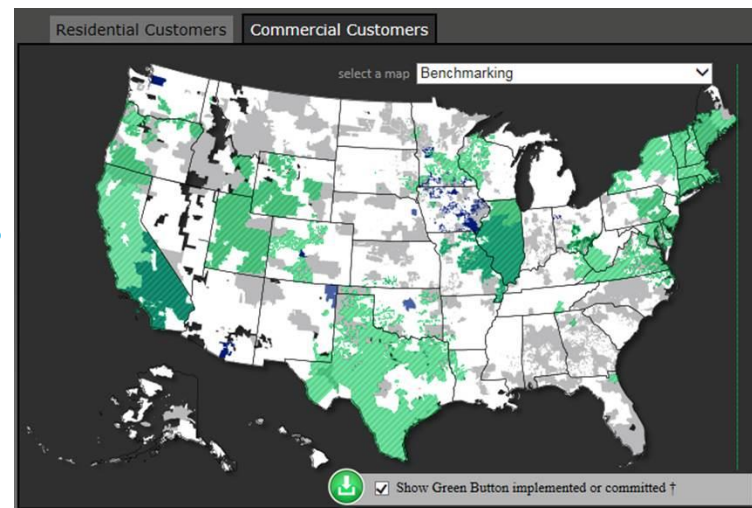
Better Buildings Energy Data Accelerator

Utilities and **local governments** partnering with DOE to commit to providing whole-building data to commercial building owners interested in benchmarking.

- Platform for commercial building owners/operators to help utilities and cities understand the importance of whole-building aggregated data for benchmarking
- Forthcoming product: briefing book to help cities, utilities, and regulators better understand the nature of whole-building aggregated data to facilitate benchmarking

Opportunities

- Additional letters of Support
- Participation in local stakeholder efforts
- Engagement with utility parent companies that span multiple states and service territories



Thank you for joining us!

Key Contacts for the Higher Education Sector on today's call

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Technology and Market Solutions Teams Contacts

Technology Solutions – Andy Mitchell, DOE lead

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Rois Langner Plug and Process Loads Team Lead Margarete.Langner@nrel.gov	Jay Paidipati Renewables Integration Team Lead jpaidipati@navigant.com
Linda Sandahl Lighting Team Lead Linda.sandahl@pnnl.gov	Rich Shandross Food Service Team Lead Richard.Shandross@navigant.com
Craig Wray Laboratories Team Lead CPWray@lbl.gov	Bob Zogg Refrigeration Team Lead Robert.Zogg@navigant.com

Market Solutions

Deborah Cloutier
Market Solutions Team Lead
dcloutier@jdmgmt.com

Questions?

Appendix

Refrigeration Team

Technical Lead: **Bob Zogg**, robert.zogg@navigant.com

■ 2014 Highlights

- Released ASHRAE refrigeration system [commissioning guide](#)
- Hannaford alternative refrigerants case study (Draft)
- Held workshop on an energy metric for supermarket refrigeration
- Held 3 Team calls and sessions at Better Buildings Summit

■ Current Activities

- Case Studies:
 - Drafting Whole Foods Market alternative refrigerants case study
 - Finalizing Hannaford alternative refrigerants case study
- Working Groups:
 - Guides to enhance utility incentive programs for supermarkets
 - Establishing an energy metric for supermarket refrigeration
 - Integrated business models to optimize refrigeration system performance

Refrigeration Team

Technical Lead: **Bob Zogg**, robert.zogg@navigant.com

■ Upcoming Opportunities

- Seek partners for additional case studies on novel refrigeration systems
- Seek additional participants in working groups

■ Plans for the Future

- Working Groups (Subject to go/no-go decisions in December):
 - Utility Incentives: Issue two guides and promote
 - Energy Metric: Secure industry commitment and support development
 - Integrated Business Models: Illustrate value proposition and promote
- Identified Need: Training in use of the ASHRAE commissioning guide